

## Patent Claims

1. Sharpener for pencils (16), and especially for pencils (16) with a rotation-symmetrical cartridge or for pencils (16) whose cartridge is arranged inside of a cartridge carrier, whose cross-section runs perpendicular to the length axis is non-hexagonal and non-circular, with
  - at least one housing (10);
  - a cutting device that is connected with this housing;
  - a holding device for the pencil (16) that is at least partially contained in the housing; and
  - a force feed device which guides the holding device along a pre-determined movement path in this housing.
2. Sharpener as described in claim 1 characterized by the fact that this force feeder has at least one feed element and at least one feed track into which this feed element is inserted.
3. Sharpener as described in claim 2 characterized by the fact that the feed element is a feed pencil.
4. Sharpener as described one of the preceding claims characterized by the fact that the feed track is a groove.
5. Sharpener as described one of the preceding claims characterized by the fact that the shape of the feed track essentially matches the outer contour of the cross-section surface of the cutting surface that creates contact between the cutting device and the pencil (16).
6. Sharpener as described one of the preceding claims characterized by a feed disk, which runs outward in a radial direction from the holding device and has at least one groove for receiving a feed element which is arranged firmly opposite the housing (10).
7. Sharpener as described one of the preceding claims characterized by the fact that cutting device is arranged firmly opposite the housing (10).
8. Sharpener as described one of the preceding claims characterized by the fact that the pencil (16) in the holding device is contained in this holding device in a rotationally fixed manner and the holding device is arranged opposite the cutting device in a movable manner.

9. Sharpener as described one of the preceding claims characterized by the fact that the pencil (16) is contained in the holding device in the direction of the pencil length axis and is movable in an axial direction.

10. Sharpener as described one of the preceding claims characterized by the fact that the pencil (16) is guided opposite the cutting device by means of a force-feed device upon sharpening in such a way that the free angle is between 2° and 10°.

11. Sharpener as described one of the preceding claims characterized by the fact that the free angle is essentially constant when sharpening the pencil (16).

12. Sharpener as described one of the preceding claims characterized by the fact that at least one sealing device is used to insulate the feed tracks.

13. Sharpener as described one of the preceding claims characterized by the fact that that sharpener (1) is made at least partially from synthetic materials.

14. Sharpener as described one of the preceding claims characterized by the fact that there is at least one container for receiving shavings.

15. Sharpener as described one of the preceding claims characterized by the fact that this sharpener can be used to generate non-rotation symmetrical cutting surfaces.

16. Sharpener as described one of the preceding claims characterized by the fact that the feed disk is guided between two plane surfaces whereby these plan surfaces prevent movement of the feed disk in an axial direction.

17. Sharpener as described one of the preceding claims characterized by the fact that there is cover device (114) for at least partial covering of an opening in the housing (1), through which the pencil (16) can be inserted into the interior of the housing, whereby this cover is spring-loaded and lays on the housing.

18. Sharpener as described one of the preceding claims characterized by the fact that there is a rotation compartment (110) at least partially in the housing (106) and moves there upon rotation around the length axis on a pre-determined path.

19. Sharpener as described one of the preceding claims characterized by the fact that the rotation compartment (110) has a feed casing (114) in which a pencil (116) can move in an axial direction, whereby a rotation of the pencil (116) around its length axis (118) causes the rotation of the rotation compartment (110) with the feed casing (114).

20. Sharpener as described one of the preceding claims characterized by the fact that the rotation compartment (110) has a feed casing (114) and cams (120a, 120b, 120c, 120d, 120e, 120f, 120g, 120h) connected firmly with this casing.

21. Sharpener as described one of the preceding claims characterized by the fact that the rotation compartment (110) has at least three cams.

22. Sharpener as described one of the preceding claims characterized by the fact that the interior space (106a) of the housing (103) is equipped with cam feeds (122a, 122b, 122c, 122d, 122e, 122f, 122g, 122h) which work together with the cams (120a, 120b, 120c, 120d, 120e, 120f, 120g, 120h).

23. Sharpener as described one of the preceding claims characterized by the fact that at least one of the cam feeds (122a, 122b, 122c, 122d, 122e, 122f, 122g, 122h) has a section facing one of the cams (120a) thru (120h), which runs essentially straight or evenly.

24. Sharpener as described one of the preceding claims characterized by the fact that at least one of the cams (120a) thru (120h) is formed by a part of the exterior surface (114b) of the feed casing (114).

25. Sharpener as described one of the preceding claims characterized by the fact that the cams (120a) thru (120h) are formed elliptically or asymmetrically.

26. Sharpener as described one of the preceding claims characterized by the fact that at least three cams (120a) thru (120h) and cam feeds (122a) thru (122h) face each other and essentially define the position of the rotation compartment (11) uniquely at each rotation angle.

27. Sharpener as described one of the preceding claims characterized by the fact that the rotation compartment (110) has at least two groups (242, 244) of cams (120a, 120b, 120c, 120d; 120e, 120f, 120g, 120h) and are spaced from each other in an axial direction.

28. Sharpener as described one of the preceding claims characterized by the fact that the rotation compartment (110) can be moved in an axial direction in a maximum of three positions in the housing whereby the position is defined by an angle range that is preferably less than 10 degrees or preferably less than 5 degrees, or preferably less than 3 degrees or preferably less than 2 degrees or preferably less than 1 degree.

29. Sharpener as described one of the preceding claims characterized by the fact that the pencil point, upon rotation around the length axis (118) at each rotation position lays on the blade edge (113a) of the knife blade (112).

30. Sharpener as described one of the preceding claims characterized by the fact that a rotation compartment (110) is provided that has a feed casing (114) in which a pencil (562) can be received, in particular in a form-fitting manner) and a support section (430) that can be used to support this rotation compartment (110) in an axial direction.

31. Sharpener as described one of the preceding claims characterized by the fact that the support section (430) is formed as a section running in a radial direction.

32. Sharpener as described one of the preceding claims characterized by the fact that the feed casing (114) has a non-constant wall thickness in the perimeter direction.

33. Sharpener as described one of the preceding claims characterized by the fact that the path of the wall strength of the feed casing (114) in the perimeter direction influences the shape of the point (560) of the pencil (562) to a sharpened.

34. Sharpener as described one of the preceding claims characterized by the fact that the support section (430) is formed to be plate-like.

35. Sharpener as described one of the preceding claims characterized by the fact that that support section (430) is arranged at the end of the feed casing (114) in an axial direction.

36. Sharpener as described one of the preceding claims characterized by the fact that the support section (430) is supported on a housing section, in particular in an axial direction, and in particular on a housing wall section that runs essentially in a radial direction.

37. Sharpener as described one of the preceding claims characterized by the fact that a housing compartment (108) is provided.

38. Sharpener as described one of the preceding claims characterized by the fact that the housing compartment (108) is configured in a multi-part fashion, in particular as a two-piece construction.

39. Sharpener as described one of the preceding claims characterized by the fact that the housing compartment (108) has a separation layer this is aligned essentially perpendicular to the length axis.

40. Sharpener as described one of the preceding claims characterized by the fact that at least three cam feed surfaces (448, 450, 452) are arranged on or in the housing compartment (108).

41. Sharpener as described one of the preceding claims characterized by the fact that at least two cams (438, 440, 442) are arranged within the housing compartment (108).

42. Sharpener as described one of the preceding claims characterized by the fact that a cam (438, 440, 442) are supported on the housing compartment (108) in an axial direction and, in particular, on the interior side of the housing compartment (108).

43. Sharpener as described one of the preceding claims characterized by the fact that in the housing compartment (108). there are at least two cam feeds (448, 450, 452).

44. Sharpener as described one of the preceding claims characterized by the fact that the housing compartment (108) has a wall (458, 460) on both sides in an axial direction that runs essentially in a radial direction, each of which is provided with an opening, preferably elliptical, through which the feed casing (114) can be inserted.

45. Sharpener as described one of the preceding claims characterized by the fact that the support section (430) is supported in an axial direction on a wall (458, 460) of the housing compartment (108) that runs in a radial direction.

46. Sharpener as described one of the preceding claims characterized by the fact that a wall of an opening (456) that is provided in a wall (458) of the housing compartment (108) running in a radial direction, is a feed surface.

47. Sharpener as described one of the preceding claims characterized by the fact that at least one cam (438, 440, 442), and in particular a cam seat (434), such as a one-piece cam seat (434) with several cams (438, 440, 442) has an opening inside in a radial direction that runs in an axial direction and this cam (438, 440, 442) or this cam set (434) with this opening is placed on the feed casing (114).

48. Sharpener as described one of the preceding claims characterized by the fact that at least three cams (438, 440, 442) are connected with the feed casing as one piece (114).

49. Sharpener as described one of the preceding claims characterized by the fact that the housing (103) is insulated either on the end wall or on both walls.

50. Sharpener as described one of the preceding claims characterized by the fact that at least two cam feeds (448, 450, 452) are arranged toward each other at an angle of 120 degrees.

## **Summary**

The invention concerns a sharpener (1) for sharpening pencils (16) with a cutting device (12), a holding device (14) and a housing (10).

Fig. 1